

METHOD AND APPARATUS FOR RECOVERING A THREE-DIMENSIONAL SCENE FROM TWO-DIMENSIONAL IMAGES

ABSTRACT OF THE DISCLOSURE

A method and apparatus for recovering a three-dimensional (3D) scene from two-dimensional (2D) images. A sequence of images is divided into a number of smaller segments and a 3D reconstruction is performed on each segment individually. All the reconstructed segments are then combined together through an efficient bundle adjustment to complete the 3D reconstruction. Segmenting may be achieved by dividing the segments based on the number of feature points that are in each frame. The number of frames per segment is reduced by creating virtual key frames. The virtual key frames encode the 3D structure for each segment, but are only a small subset of the original frames in the segment. A final bundle adjustment is performed on the virtual key frames, rather than all of the original frames. Thus, the final bundle adjustment is two orders of magnitude faster than a conventional bundle adjustment.